

Civil Integrated Management 3-D Modeling from a Program's Perspective Contractor Input

Chris Goss
Hoffman Construction Company
06/15/2012

Use of 3-D Models

- Pre-Bid

(Goal - How can I reduce the cost of my bid so I can be the low bid?)

- Cost to create the model for construction
 - This price can range from \$2,000 to \$15,000 depending on size of project and usefulness of data provided.
- Looking for borrow excavation areas
- Volume of non-structural areas

Use of 3-D Models (cont'd)

The Goal after Award



Use of 3-D Models (cont'd)

- Post-Award
 - The hand-off of data files from DOT to Contractor affects operations. Grading is usually one of the first items performed on a project, so the availability of data files helps get to the delivery date. Sending out pieces of the model leads to multiple updates and a chance for errors in each creation and transmission.
 - The processing of the files takes some time. It can be a week, or it can be over a month.
 - What format of data files are there available? Can I use them?
 - Import them into design software.
 - Review and adjust to match the paper plans.
 - Check final model against plans
 - Export to files that the equipment and rovers can use.

Model Data Types

- Text Format
 - Station, Offset, Elevation, (Description?)
 - Caice Slope Stake Report (*.ssk)
 - Pros
 - Simple data that can be understood by many parties (exporter and importer)
 - Can be used as a cut sheet to get the grading foreman on his way
 - Easily imported since this file type has been around a quite a while
 - Cons
 - Usually, it does not have good descriptions or they are inconsistent. It requires a lot of work prior to import.
 - Often comes from older design programs where the data is not the same as the cad-manipulated drawings
 - No forced break lines or TIN. Leaves room for interpretation in model

Model Data Types (cont'd.)

- Digital Design Files
 - *.xml, *.dwg, and *.dgn (thumbs up!)
 - 3-D model with Linework, please
 - Pros
 - TIME, TIME, TIME - Imports quickly. You are reviewing the model early in the process and are checking rather than recreating. Exporting to equipment earlier in the schedule.
 - The intent of the drainage is in the model, less interpretation
 - TINs for models.
 - Linework layers for the features
 - Cons
 - Reluctance of individuals to provide the data, usually due to lack of training on how to export the correct data. Time can be wasted here until the data is finally released.
 - Files can be a mess to sort through if the design files were not maintained well. Spaghetti comes to mind.
 - File versions for import can be a hurdle with all the software companies.

USH 10 Pilot Project

- This was a pilot project for WisDOT and Hoffman to review the hand-off and use of digital data files on a rural, four-lane grading project.
- The first set of files required a lot of reducing and adding of features. It was a struggle with which to work and review.
- WisDOT and Hoffman met and did some trading of sample files to see what would work better.
 - TIN data is great for the grades, but it doesn't do much for the visual orientation for the equipment operator or grade staker.
 - How can linework showing the planimetric features be exported? This will help the equipment operator stay oriented on the grade.
 - A new export file was created that had 3-D linework with point data incorporated. This is what the Hoffman designer was desiring, "The new data made the process from import, through reduction, and to export into the equipment and rover files extremely efficient!"

Closing Remark and Questions

- Hoffman has been involved in the process of developing the gps grading specifications and multiple pilot projects involving the grading and exchange of data files. WisDOT's and Hoffman's commitment to work together to come to a good solution has been very important to the program's success. All individuals involved understood that this is the route the industry has headed and its time we take advantage of the savings the technology can bring to the state. Pick a great team that can make it happen.